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ABSTRACT

Alternative conceptions of classroom learning are explored in this paper, with a focus on challenging current assumptions about learning, teaching, and creating conditions to improve schools. The constructivist view is offered as a different approach to the behaviorist concept of learning and the metaphor of the classroom as a workplace. From a constructivist perspective, learning is viewed as the active construction of knowledge in gradually expanding networks of ideas through interactions with others and materials in the environment. Whether students perceive themselves as "learners" depends on ongoing classroom interactions, which in turn are influenced by teachers' beliefs and the type of educational community support. Rather than modifying structural elements for educational change, a more appropriate starting point is knowledge about the nature of learning and the different ways of learning for various purposes. One table is included. (36 references) (LMI)

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Reconceptualizing Learning for Restructured Schools*

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Reconceptualizing Learning for Restructured Schools*

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This symposium continues a dialogue on alternative conceptions of classroom learning that began in earlier AERA programs (1988, 1989, 1990) and continued last year in a session on "Restructuring Schools for Learning" (1991). We have deliberately brought together representatives of several aspects of the educational enterprise to expand the way we seek to answer questions regarding what we need to consider in restructuring schools based on new knowledge of how students learn in more meaningful and integrated ways than is commonly found today.

Periodically, I am struck by unexamined assumptions that we hold as truths; but which on closer examination or in the face of new information crumble and turn out to be true only in limited circumstances. I recall, as an educational psychology graduate student in the early 1960's, I had to learn the theories of learning as they were then "known." I remember memorizing factors that influenced speed of learning. These laws of learning were based on experiments using nonsense syllables. You can imagine my surprise when I later learned that if meaningful syllables--words, that is--were substituted for nonsense syllables, the laws I had memorized were no longer valid. With meaningful learning, semantic networks became important. The speed with which subjects learned lists of words--as opposed to nonsense syllables--was influenced by how closely the words were linked in meaningful networks and whether subjects could be taught to make meaningful links. After my initial shock, I was able to step back "through the looking glass" from the "nonsense world" and understand a more real world. I think I have been a little wary of accepting anything as "Truth" since that experience.

I see an analogy to this experience in what is happening today on the larger educational scene in terms of different views of the nature and purpose of learning and the implications for restructuring schools. Our focus, therefore, is on challenging assumptions currently held as true about learning and teaching, as well as assumptions about the conditions needed to improve education and to "restructure" schools.

Like the naive graduate student, when we speak of learning, we assume we have a common understanding of what learning is. On closer examination, however, learning can be seen to have many different meanings depending on the context and the theoretical framework in which it is used. In considering school improvement, we need to bring to conscious awareness our implicit assumptions about learning and examine these beliefs and their implications for the type of schools we structure and the type of citizen we produce. We also need to consider the assumptions and implications of emerging views of how students learn.

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EA 024 134

Currently, most schools are based on behaviorist assumptions about the nature of learning. From this perspective--and using the extreme of the behaviorist position to highlight my point--learning is defined as the acquisition of facts, skills, and concepts often through drill and guided practice of discrete elements. Teaching (usually teaching-as-telling) is assumed to cause learning in rather passive students, as shown in Table 1 (cf. Peterson, 1992; Weade, 1992).[1]

Additional assumptions are related to the metaphor of the classroom as a (factory-type) workplace (Marshall, 1988). Teachers are assumed to be managers supervising students/workers who produce worksheets/products as evidence that learning has occurred for the reward of grades or promotion. This description is familiar to all of us--since we have been socialized in this system. From this perspective, the purpose of schools is to transmit a rather static body of knowledge needed by everyone and acquired in the same prescribed manner and now to meet the same national standards--in assembly line fashion. On another level, the students themselves are seen as products--workers produced by schools. The products/students/workers are essentially interchangeable and can be plugged into jobs as needed.

The practices derived from these assumptions appear to be accepted as normal, standard, often routinized practice. These accepted practices are so ingrained that they have become invisible to most of those within the culture of the school; and therefore the practices, the assumptions on which they are based, and the consequences for students remain largely unexamined. Even where teachers have had different experiences and hold divergent beliefs, they often feel compelled to conduct school in the accepted manner.

Behaviorist theories of learning, "ordinary" practices derived from them, and the metaphorical nature of our language (Lakoff & Johnson, 1980) thus contribute to beliefs about classroom learning as well as to proposed solutions to educational problems. In considering how schools should be restructured, one question to raise is whether the type of citizen produced by schools whose goal is to transmit accumulated knowledge--known answers to standard problems--is the type of citizen needed in a rapidly changing world where new answers to new problems and flexible responses to new situations are required, where citizens will need to continue learning for a series of different jobs within a lifetime. You'd think that Charlie Brown, in one of my favorite Peanuts cartoons, was contemplating these issues when he propounded that "In the book of life, the answers are not in the back." Certainly, this is true (or I assume it is true) as we look to the future. We dare not respond as Lucy did, "I think you're in trouble"--though surely we will be in trouble if we continue to believe that learning answers that are already known or can be found in the back of the book will serve us in the future and if we fail to rethink the basis for educational reform to deal adequately with new realitites.

Schön (1979) suggests that by changing ways of thinking about a problem and the metaphors for these problems, more effective solutions can be stimulated. To find a more effective solution to our educational problems, we

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[1] Why most schools adopted the behaviorist view is interesting, but beyond the scope of this paper. (See Farnum-Diggory, 1990; Marshall, 1992b.)

need to seek alternatives to behaviorist-derived notions of learning and metaphors of the classroom as a workplace (Marshall, 1988).

To respond effectively, we will need to step out of our ordinary way of thinking and consider other views of learning. At a minimum, we need to be aware that learning can refer to the acquisition of strategies to perform a task to the teacher's satisfaction--what Bloome, Puro, & Theodorou (1989) have called "procedural display" (see also Edwards & Mercer, 1987; Perret-Clermont, Perret & Bell, 1991)--but without deeper understanding of the underlying substantive content (cf. Collins & Green, 1992). For example, students can learn to fill in the blanks on a worksheet by clues or patterns in the questions but without having to think about or process the intended substantive content--like the now famous student who commented as he turned in his completed worksheet, "I did it; but I don't know what it means" (Anderson et al., 1985). We need to be cautious about our sometimes mistaken assumption that worksheets and similar products or performance indicate substantive learning rather than the learning of strategies to complete the task quickly and with minimal effort.

More significantly and in contrast to the common understanding of learning derived from the behaviorist viewpoint, learning can mean the active construction of knowledge in gradually expanding networks of ideas through interactions with others and materials in the environment. It can refer to learning strategies that allow information to be connected in multiple meaningful ways with relevant experiences, to be processed on deeper levels, to solve complex problems and to extend understandings of the world and self. This alternative type of learning is based on a constructivist framework and is consistent with what has been referred to as "learning for meaningful understanding" (cf. Anderson, 1989; Brophy, 1989). This view is in some ways analogous to moving beyond nonsense syllables to the learning of meaningful words and on to learning from larger segments of the world.

To elaborate very briefly, constructivists believe that individuals <u>actively</u> construct knowledge and understanding (cf. Piaget; Vygotsky; Wertsch), rather than passively receive information in response to external forces, such as rewards. This contrast is shown in Table 1--which continues to be revised and reconstructed as does my own undertanding. According to constructivist views, learning consists of building on what the learner brings to the situation and restructuring initial knowledge in widening and intersecting networks of increasingly complex understanding. Peterson (1989) has used the metaphor of tinker toys to describe this type of learning--in contrast to building blocks used by behaviorists. Metaphors can only capture a part of the similarity. The structural possibilities of tinker toys may be a little too fixed. Perhaps pipe cleaner sculpture comes a little closer to the flexible, dynamic, and organic intent of this view--though this metaphor, too, is limited.

In classrooms where teaching is based on a constructivist framework, the purpose of schools is not just the transmission of accumulated knowledge but the creation of new knowledge and new strategies for solving new problems. Skills and concepts are learned within meaningful and integrated contexts rather than in an isolated and hierarchical manner. Multiple opportunities are provided to come to understandings in different ways. Teachers cultivate deeper understanding by encouraging students to "think through" questions and answers, to challenge each other and ideas, to generate knowledge, to

recognize multiple viewpoints, to evaluate their own learning, and to assume more responsibility for their continued learning (Collins & Green, 1992; Edwards & Mercer, 1987; Peterson, 1992; Santa Barbara Classroom Discourse Group, 1992). (The answers are not in the back of the book.) In this type of classroom, students are more actively involved with materials and each other. When students discuss their ideas, they are more likely to become more aware of the links between these ideas and their own prior knowledge as well as other new ideas. In these classrooms, the teacher does not serve as the main source of knowledge-transmission; both students and teachers assume multiple roles. The metaphor moves beyond a workplace to what might be thought of as a "learning place" (Marshall, 1988, 1990) or a "community of learners" (e.g. Brown, 1992), where both students and teachers are learners.

Teachers with this perspective recognize that learning does not occur all at once or in a linear manner (one month's growth for one month's time), but is built over time as initial knowledge is revised when new questions arise and old knowledge is challenged (e.g., Peterson, 1992; Wood, Cobb, & Yackel, 1992). It takes time to delve more deeply into problems and issues, and larger blocks of time are allowed for this process.

Although there is some commonality among constructivist perspectives, social and cognitive constructivists vary regarding the nature and influence of the social world in the process of knowledge construction. Whereas cognitive constructivist views of learning suggest that the learner constructs knowledge--often with the guidance of an expert--social constructivists place greater emphasis on the role of the social interaction through which contexts, knowledge, and meanings in everyday life are constructed and reconstructed. According to a social constructivist framework, learning and thinking are situated in social contexts rather than occurring in an individual's mind (e.g., Newman, et al., 1989; Wertsch, 1985; Vygotsky, 1978). Through discussions with others--where ideas are shared, challenged, and justified--new levels of conceptual understanding can be reached (Edwards & Mercer, 1987; Vygotsky, 1978). The metaphor in this perspective moves beyond more or less individual pipe cleaner construction to some kind of joint construction or collaborative game, perhaps akin to those mystery game dinners where the boundaries are set but clues are discovered by talking and listening to others who bring in different information.

An example of how students interact with each other to challenge the thinking of their peers and come to new understandings of the elements of story comes from an English class where the teachers were experimenting with a seminar format (Santa Barbara Classroom Discourse Group, 1992). As the class sessions proceeded and students began to learn to work together in small groups, they were asked to define characters in the story they were reading. The first group reported five characters. This group was challenged by the second group, who argued that there were only two. The third group agreed with the first. As each group gave their reasons, one group suggested that "the way to define characters was to view only those people in the story who 'talk or participate' as characters." Some students argued that this would exclude those who were mentioned but not physically present. When one student named the characters and suggested they were the "main characters," the teacher picked up on this idea; and in the discussion that followed, suggested the idea of minor characters. Here, both students and teachers were sources of knowledge, aiding in the construction of understanding.

Social constructivists also suggest that it is not only substantive knowledge in the formal sense that is constructed (here the definition of character), but how and what it means to be a student and what is of value and worth knowing that are continually constructed in dynamic and ongoing interactions among the participants. Norms, expectations, and opportunities for learning are socially constructed. In interaction with the particular teacher and students in the class, students learn to read and interpret the situation. They come to have an understanding of what each situation requires, such as how to think about and respond to their classmates' ideas in the English class example. This, in turn, influences their processing of substantive content and their level of understanding. Within the social context, students essentially learn how to "do school," how to be a "student" in the particular setting. The students in the English class learned not just about literature, but also what it meant to learn in a seminar-style class. By understanding how something is learned, we can also better understand what it is that is learned (Lave, 1991; Resnick, 1991).

Peterson (1992) graphically portrays how, as one teacher acquired deeper understanding of how children learn, she gradually moved away from the notion of teaching as telling toward a belief in encouraging students to explain their thinking to others, to question others' meanings, and to revise their own understandings as new insights arose. As her expectations and requirements moved away from following a "scripted lesson" and the usual emphasis on "covering" the material toward an emphasis on each student's expressing and discussing how each knew, new roles and responsibilities, norms and expectations were constructed. At one point, the teacher asked her third graders to include on their homework their reasons for their answers to problems with positive and negative numbers. Although many students arrived at the correct answer, only one or two recorded their reasons. (They had not previously been expected to be able to explain their thinking.) How much they really understood was unknown. In class discussion, many could not explain it; but they gradually began to see that having the correct answer was no longer sufficient evidence of learning. They now had to know how to justify their answers and their thinking publicly. What was learned as well as the meaning of learning in this classroom evolved toward deeper understanding and expressing understanding of content in ways not represented by the bits of information reflected on traditional worksheets and achievement tests. (See Marshall, 1992a, for further details of this and additional examples of what happens in classrooms based on this framework and further elaboration of these ideas.)

Thus, whether students come to see themselves as "learners," "sense-makers," "problem-solvers" and "contributors to group processes" rather than "workers," "rememberers and forgetters" (Lampert, 1986) and "algorithm-followers" is a function of the ongoing interactions within the classroom setting and over years of schooling. These interactions are in turn a function of teachers' beliefs about the nature of learning and the support or constraints provided by those in the educational community--parents, building and district administrators, curriculum developers, the school board. The opportunities created for learning, the meaning of learning, and the conception of self as student have important long-term consequences not just for the type of skills and knowledge acquired but also for how individuals see themselves and for the future. Whether they will be up to meeting new challenges rather than relying on outmoded routines will depend on whether we

can change our way of thinking about learning and the purposes of learning and create the opportunities required to meet this challenge.

We know from both qualitative and quantitative research (Marshall, 1992b) that students who are provided opportunities to become what Bereiter (1990) has called "intentional learners" or what others have called "learning-oriented" (Marshall, 1988) or "task-oriented" (Maehr & Midgely, 1991; Nicholls, 1983) or "mastery-oriented" (Ames, 1990; Ames & Ames, 1984; Ames & Archer, 1988) tend to chose challenging tasks over easy ones regardless of how they see their ability, because their concern is with understanding and mastering something new rather than being able to perform well. In addition, there is evidence that students who are provided opportunities for knowledge-construction rather than routinized and decontextualized practice can do as well or better even on standardized achievement tests (e.g., Carpenter, Fennema, Peterson, Chiang, & Loef, 1989; Wood, Cobb, & Yackel, 1992).

Let us turn now to what this means for restructuring schools. "Restructuring" has been the prescribed remedy for what ails America's schools. However, there is little agreement about the ingredients or formula for the restructuring medicine. As Elmore (1991) and Evertston and Murphy (1992) have pointed out, restructuring means different things to different people, such as choice, administrative decentralization, new accountability systems, different scheduling and grouping, new roles for teachers, parent involvement, and so on.

What has been overlooked in these prescriptions for restructuring, however, are the learners themselves and how students learn. Also often neglected is the type of citizen needed for the rapidly changing world of the 21st century. Many of those who advocate restructuring have concentrated on structural elements--perhaps because these are more visible, perhaps because the assumed nature of learning has been so ingrained that it is not considered, perhaps because many educators are unaware of alternative conceptions of learning and new knowledge of how individuals learn. What we propose is that rather than begin by modifying structural elements, a more approprate starting point is knowledge about what learners are like and how they learn in different ways for different purposes.

The remainder of this symposium will continue on the trail back through the looking glass and focus on conditions that support more meaningful types of learning as the basis for restructuring schools--from the viewpoints of teachers, administrators, policy-makers, and researchers.

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Table 1

Some Assumptions Underlying Views of Learning that Influence Perceptions and Interpretations

	Behaviorist-derived*	Constructivist-derived*	
		Cognitive	Social
Knowledge	Fixed body of knowledge to acquire	Changing body of knowledge, individually constructed in social world	Socially constructed knowledge
	Discrete elements as "building blocks"	Interrelated networks as "tinker toys" or "pipe cleaner sculpture"	Collaboratively constructed as "mystery dinner game"
	Single sets of right answers	Multiple viewpoints	Multiple viewpoints, interpretations of knowledge and social requirements
	Decontextualized	In meaningful context	In meaningful and social context
	Stimulated from outside	Built on what learner brings	Built on what participants contribute, construct together
Learning	Acquisition of facts, skills, concepts	Active construction, restructuring prior knowledge	Collaborative construction of socially defined knowledge and values
	through drill, guided practice	through multiple opportunities and diverse processes to connect to what is already known	through socially constructed opportunities
	within individual's head	in interaction with others, environment	in interaction with others, environment
	Surface processing, procedural display	Deep processing	Multiple processing of content, procedures (how to learn), interpretations (what it means to learn, which knowledge is of value)

(cont.)

* There are variations within each of these views of learning that vary in emphasis. There is also an overlap in constructivist views.

Teaching	Transmission Presentation (Telling)	Challenge, guide thinking toward more complete understanding	Co-construct knowledge (w/ sts)
			Expand repertoire of options (of how to go about learning)
Goals	Complete work	Continue learning	Continue learning in socially defined ways
		Extend understandings of world and self	Extend understandings of world and self
Motivation	Rewards, grades, jobs	Self-development, competence	Participation in social group
Role of Teacher	Predefined as adult	Self or anyone with greater expertise	Self or anyone with greater expertise
	Primary source of knowledge	A source of knowledge (along with student, materials, environment)	A source of knowledge (along with others, materials, social artifacts, environment)
	Manager, supervisor	Facilitator, guide	Facilitator, guide
			Co-participant
	Encourage on-time task-completion	Create opportunities for interacting with meaningful ideas, materials, others	Construct with students opportunites for interacting with meaningful ideas, materials, others
	Correct wrong answers	Listen for ideas, misconceptions	Co-construct different interpretation of knowledge; listen to socially constructed conceptions
Role of Peers	Not usually considered	Not necessary; but can stimulate thinking, raise questions	Ordinary part of process of knowledge construction
			Contribute to definition of knowledge (in inter-subjective space of group)
			Help define opportunities for learning

(cont.)

Role of Student	Passive reception of information	Active construction (within mind)	Active co-construction with others and self
		Source of knowledge (individual and group)	Source of knowledge (group and individual within group)
	Worker	Generator, constructor	Co-generator, co-constructor
	Active listener, direction-follower	Active thinker, explainer, interpreter, questioner	Active thinker, explainer, intepreter, questioner
			Active social participator
	Complete work on time	Understand, question, explain	Understand, question, explain
			Co-construct, interpret social context
Student's View of Self	Rememberer/forgetter, algorithm-follower, worker	Sense-maker, problem-solver	Sense-maker, interpreter problem-solver
			Socially appropriate member of group
Evidence of Learning	Products	Process of inquiry	Process of inquiry
			Socially competent participation in group
	Performance (answers) on worksheets, standardized tests	Explanation of reasoning	Explanation of reasoning
			Social performance assessed over multiple sites
	Assessed in single setting at one or periodic points	Ongoing assessment	Ongoing assessment over multiple sites
Purpose of School	Transmit, reproduce common body of knowledge	Create new knowledge, learn strategies to continue learning	Create new knowledge, learn strategies to continue learning
			Prepare individuals for life within social world
			Expand options, repertoire of socially appropriate ways of interacting

Note: Extended from Marshall (1990) and stimulated by Literacy in Science and Social Studies Project (March, 1991), Roth & Rosean (April, 1991), and ongoing discussions with Judith Green.